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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,699	12/01/2003	Francois X. Prinz	24317/82501	2551
37803 7590. 11/16/2007 SIDLEY AUSTIN LLP 555 CALIFORNIA STREET SUITE 2000 SAN FRANCISCO, CA 94104-1715			EXAMINER BEHM, HARRY RAYMOND	
			ART UNIT 2838	PAPER NUMBER
			MAIL DATE 11/16/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/725,699

Applicant(s)

PRINZ ET AL.

Examiner

Harry Behm

Art Unit

2838

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2,3,7,15 and 17-21 is/are pending in the application.
- 4a) Of the above claim(s) 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2,3,7 and 17-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments with respect to Sellers (US 5,189,601) have been considered and are persuasive. The rejections under Sellers have been withdrawn.

Furthermore, upon further consideration the rejections under Brooks (US 6,356,063) have been withdrawn as Brooks disclosure of a DAC is not a broadest reasonable interpretation of a memory.

Applicant's arguments concerning Corsi (US 5,912,551) or Duffy (US 2002/0171985), filed 10/15/07, have been fully considered but they are not persuasive.

Applicant argues Corsi does not disclose an algorithm generator distinct from the duty cycle generator, digital counter and first comparator. However, Applicant's claim language does not require the algorithm generator be distinct from the duty cycle generator, digital counter and first comparator. The claim language algorithm generator is broad and only requires production of an algorithm, such as the controller disclosed by Corsi.

Applicant further argues Corsi does not disclose an algorithm that determines the rate of change of modifying the duty cycle. However, since duty cycle is controlled, the rate of change of the duty cycle is controlled, therefore the rate of change of modifying the duty cycle must be determined.

The duty cycle is changed as a function of  $V_{ref}$ ,  $V_{ck}$  and  $V_{out}$ . Since  $V_{ref}$  and  $V_{ck}$  are normally fixed, the duty cycle is changed in response to  $V_{out}$  which changes due to the load, that is, the duty cycle is changed at a rate in response to the load.

Applicant argues Duffy does not disclose changing the frequency of alteration of the duty cycle. However, in Fig. 14 at time 1450, Duffy discloses turning on the power transistor uppers before they would turn on at the previous switching frequency up to time 1450. Therefore, Duffy has disclosed changing the frequency of alteration of the duty cycle at time 1450. Duffy has not simply extended the period since the individual phases have continued to discharge. Clearly the frequency of alteration has been changed, since the power transistors have turned on before the period of the old switching frequency has completed.

Applicant further argues Duffy does not minimize a dip in the output. However, by turning the power transistors on immediately at time 1450, and not waiting for the original switching period to end before turning the power transistors on, Duffy has prevented a dip in the output voltage which would have occurred if the original switching period were allowed to complete before turning on the power transistors.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 2 is rejected under 35 U.S.C. 102(b) as being anticipated by Corsi (US 5,912,551).

A digital control system for controlling a switch (Fig. 1 10) of a voltage converter, comprising:

a duty cycle generator (Fig. 1 22 and Fig. 2 46,44) that provides a duty cycle [on/off time to gate of power switch] for the switch (Fig. 1 10);

a digital counter [Fig. 1 20 is depicted as a counter, but only flip flops 40 and 42 in Fig. 2 create the counter] that stores a plurality of entries [two bit counter shown], wherein each entry (Fig. 2 Q1z,Q2) can be input [input to 46] to the duty cycle generator (Fig. 1-2 46,44,22) for modifying the duty cycle [gate signal on/off time] in response to a varying load [change in load causes  $V_{out}$  to deviate from  $V_{ref}$ , which changes the count];

a first comparator (Fig. 1 28) that compares an output voltage (Fig. 1  $V_{out}$ ) to a reference voltage (Fig. 1  $V_{ref}$ ); and

an algorithm generator (Fig. 1 20-32) producing an algorithm that determines the rate of change [duty cycle changed at rate in response to load] of for modifying the duty cycle;

wherein if the first comparator (Fig. 1 28) detects that the output voltage is higher than the reference voltage, the algorithm generator [signal  $V_{com}$ ] affecting the input of entries from the digital counter [counter reset] into the duty cycle generator, thereby adjusting the rate of change for modifying the duty cycle of the switch [switching prevented].

Claims 7 and 17-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Duffy (US 2002/0171985).

With respect to Claim 7, Duffy discloses method for producing a desired output voltage (Fig. 12 Vo) comprising:

storing in memory (Fig. 8 730), an indication [error voltage used to generate duty cycle] of a duty cycle [on/off time of power switch] needed for a varying load (Fig. 6 530); monitoring the load (Fig. 6 VSEN<sub>P</sub>, VSEN<sub>N</sub>, ATRHC, ATRLC);

altering the duty cycle (on/off switching of power switches) at a first frequency (Fig. 14 initial frequency in which transient support (Fig. 6 540) is not used) to produce the desired output voltage (Fig. 6 572) based upon the indication; and

if a change in the load is detected (Fig. 9 910 comparator detect outside of window), changing the frequency (Fig. 14 period extended after load changes at 1450) of alteration of the duty cycle;

wherein if the load increases (Fig. 14 1450), the frequency of alteration is increased (Fig. 6 540 quickly activates switches), thereby minimizing a dip in the output voltage [increased output current minimized output voltage drop].

With respect to Claim 17, Duffy discloses the method of claim 7 wherein monitoring the load (Fig. 6 530) comprises usage of two (Fig. 9 910) or more comparators.

With respect to Claim 18, Brooks discloses the method of claim 17 wherein the two (Fig. 6 602, 604) or more comparators each have a different reference (Fig. 6 Vref+ $\Delta b_1$ , Vref- $\Delta b_1$ ).

With respect to Claims 19-21, Duffy discloses a voltage converter. See claims 7 and 17-18 for item matching.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Corsi (US 5,912,551) in view of Ogasawara (US 6,377,428).

With respect to Claim 3, Corsi discloses the system of claim 2. Corsi does not disclose a second comparator. Ogasawara teaches an overcurrent comparator (Fig. 1 CMP1) for controlling a switch of voltage converter. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a second comparator with a different voltage reference. The reason for doing so is for "detecting an abnormality" (Ogasawara column 1 line 10), such as an overcurrent, undercurrent, overvoltage or undervoltage.

***Conclusion***


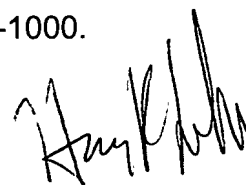
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry Behm whose telephone number is 571-272-8929. The examiner can normally be reached on 7:00 am - 3:00 pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**BAO Q. VU**  
**PRIMARY EXAMINER**